

REMARKS

By the present Amendment, the revision to page 12 of the specification has been removed and claim 32 has been canceled without prejudice or disclaimer thereby meeting the Examiner's objection to the specification and rejection of claim 32 under 35 U.S.C. §112. The present Amendment also adds new claims 33-37 which recite certain aspects of the invention by defining the structure and the method of preparation consistent with the teachings of the specification, particularly on pages 3-13.

In light of the lengthy prosecution to date, applicants believe that a discussion of certain claim aspects and the importance thereof is in order. As set forth in current claim 1, one aspect of the present invention is a resin composition to be used in a multi-layer laminate for storing liquid foods comprising a hydrophilic reducing organic compound and a hydrophilic and water insoluble thermoplastic resin wherein the hydrophilic reducing organic compound is included in the hydrophilic and water insoluble resin and the hydrophilic and water insoluble resin provides an oxygen gas barrier for the hydrophilic reducing organic compound and wherein the hydrophilic reducing organic compound and the water insoluble thermoplastic resin are dispersed in a hydrophobic thermoplastic resin. The claim now further recites that the resin composition is prepared by:

kneading the hydrophilic reducing organic compound and the hydrophilic and water insoluble thermoplastic resin at a temperature not higher than the melting temperature or decomposition point of the hydrophilic reducing organic compound and equal to or higher than the melting temperature of the hydrophilic and water insoluble thermoplastic resin to form a kneaded compound; and

kneading the kneaded compound comprised of the hydrophilic reducing organic compound and the hydrophilic and water insoluble thermoplastic resin compound with the hydrophobic thermoplastic resin so that the kneaded compound is dispersed in the hydrophobic thermoplastic resin.

Consistent with the claims, those of ordinary skill in the art will understand that hydrophilic reducing compound is protected by the hydrophilic and water insoluble thermoplastic resin and this combination is then dispersed in the hydrophobic thermoplastic resin. The hydrophilic and water insoluble resin provides an oxygen gas barrier for the hydrophilic reducing organic compound until such time that oxygen can permeate through the hydrophilic and water insoluble thermoplastic resin when the resin is wetted (such as by the contents of a contained material). In this way, the effectiveness of the hydrophilic reducing compound can be preserved against the presence of ambient oxygen until such time that the composition is contacted by water. This understanding is supported by the technical results provided in the specification. For instance, Embodiments 1-4 in Table 1 on page 18 of the specification show that when water is present, oxygen can be effectively absorbed. On the other hand, when no water is present (Reference Examples 1-4), oxygen is not absorbed.

The technical results set forth in the specification have been further supported by the evidence that has been submitted during the prosecution. For instance, in the Declaration under 37 C.F.R. §1.132 submitted by mail on May 16, 2001, Comparative Examples were provided which showed that when all the compounds are kneaded together, rather than in the defined sequence, the hydrophilic reducing organic compound is depleted

even in the absence of water. Thus, it is without question that the claims of record define subject matter which is substantially different from material which is prepared when a different sequence is followed.

With a proper understanding of the present invention and the significant advantageous results which may be obtained therefrom, applicants respectfully submit that the various combinations of prior art set forth in the Official Action would not lead one of ordinary skill in the art to the presently claimed invention and would not lead to an appreciation of the substantial advantages which may be obtained therefrom. More specifically, the Examiner has rejected a first group of claims as allegedly being unpatentable over the combination of Koyama et al., U.S. Patent No. 5,274,024, in view of Laid-Open Japanese Patent No. 56-96686 (referred to by the Examiner as Daiichi Seiyaku) and Teumac et al., U.S. patent No. 5,663,223. Koyama et al. relates to an oxygen-absorbing resin composition which can be used for preserving water-containing contents such as drinks and pre-cooked food. The composition comprises a heat-formable resin or resin composition having an oxygen permeation coefficient which is larger than 10^{-12} cc·cm/cm²·sec·cmHg and a water adsorption of at least 1% in pure water at 20°C (see column 2, lines 60-64) and an oxygen scavenger incorporated into the resin or resin composition. The composition can be formulated into a laminate, a liner, a cap or a vessel. The resin composition is disclosed in the passage beginning at column 5, line 32 and is described as being a blend of a specific water-absorbing resin with an olefin resin, more specifically a blend of a polymer selected from the group consisting of a modified polyethylene oxide, a vinyl alcohol polymer, a sodium acrylate polymer and an acrylic acid/vinyl alcohol copolymer with an olefin resin. The oxygen scavenger used in the composition is disclosed in the passage beginning at the top of column 4 and is a water-

insoluble oxygen scavenger which is preferably reducing iron (which is used in each of the illustrative Examples).

It is without question that the composition described in Koyama et al. is substantially different from the various aspects of the invention defined in the claims of record. Indeed, by following the teachings of the patent, one would be led away from an important aspect of the present invention. That is, as explained above, the claims recite that the hydrophilic and water insoluble thermoplastic resin provides an oxygen gas barrier for the hydrophilic reducing organic compound. In contrast, the disclosed composition of Koyama et al. specifies an oxygen permeation coefficient which is **larger** than 10^{-12} cc·cm/cm²·sec·cmHg. In this respect, it will be appreciated that the patent does not disclose that the heat-formable resin functions as an oxygen gas barrier. Instead, a separate gas-barrier layer 4 is described as being present in certain embodiments.

While the foregoing should itself be sufficient to distinguish the present invention, Koyama et al. also does not disclose the specifically defined sequence wherein the hydrophilic reducing organic compound and the hydrophilic and water insoluble thermoplastic resin are first combined and the obtained kneaded compound is then mixed with the hydrophobic thermoplastic resin and certainly does not recognize the advantages which can be obtained therefrom. Quite to the contrary, Koyama et al. requires a blend of the components and, in Example 1 of the patent illustrates the importance of a blend of all three components mixed together relative to a material made from only one or the other of the resin components with the reducing iron. Therefore, if one follows the teachings of Koyama et al. (as further reflected in the claims), one would be led away from the

invention defined in the claims of record. Manifestly, the presently claimed invention is patentable over this reference.

The additional reliance on Daiichi Seiyaku would not result in any aspect of the present invention and will actually be inconsistent with the teachings found within the document itself and those of Koyama et al. More specifically, Daiichi Seiyaku discloses the use of indirect additives containing ascorbic acid and particularly zeolite on which ascorbic acid is adsorbed. A complete English translation of this document was provided with the response filed on December 4, 2002, and from this translation it can be appreciated that the zeolite is filled into small porous bags which are incorporated into the contents of the food material similar to the conventional presence of bags containing silica gel which one can find in a variety of containers. Such use is significantly different from incorporating the material into a resin composition forming a portion of the container as described in Koyama et al. Moreover, Koyama et al. specifically describes a preference to metal powders, particularly reducing iron and to attempt to substitute ascorbic acid as the oxygen scavenger would be proceeding contrary to the stated preferable material in Koyama et al. Thus, there is no proper basis for combining the distinct teachings of the respective document and, even if there existed such a basis, those of ordinary skill in the art still would not arrive at applicants' claimed invention by the combined teachings of the documents.

Teumac et al. has been relied on to allegedly show that oxygen scavengers that were once added directly to foodstuffs are now being incorporated into the food-packaging container. What this section of the patent actually states is that "attempts" have been made

to incorporate the oxygen scavenger into the container and not that it is a common practice. What Teumac et al. actually teaches, as is evident from the paragraph beginning at column 4, line 25, is a liner composition which specifically includes at least an inorganic sulfite compound or a tocopherol compound in an amount sufficient to protect against development of off-flavor in a potable fluid in the container. Based on this specific teaching, one would be directed to the use of an inorganic sulfite compound or a tocopherol compound, and not the oxygen scavenger disclosed in Daiichi Seiyaku which is neither an inorganic sulfite compound nor a tocopherol compound and is specifically taught in a location which is separate from any liner. Moreover, even if one could rely on the teachings of Teumac et al., one would still not arrive at the presently claimed invention since the patent likewise does not teach the specifically defined sequence nor in any way provide a recognition of the significant advantages which can be obtained therefrom. Furthermore, neither Daiichi Seiyaku nor Teumac et al. remedy the deficiency of Koyama et al. of failing to teach the defined gas barrier as set forth in the claims. Thus, with a proper understanding of the present invention and the fair teachings of these documents, those of ordinary skill in the art will recognize that all the claims now of record are patentable over this combination of documents.

The Examiner has additionally relied on Moritani et al., U.S. Patent No. 4,999,229, with the previously three stated documents in order to reject claims 12 and 13. Moritani et al. has been cited to teach a three-layer laminate comprising an inner layer having low moisture permeability, an intermediate gas-barrier layer, and an outer layer.

Even assuming that a proper basis exists for combining the teachings of Moritani et al. with the hypothetically modified material of Koyama et al. in the manner suggested by the Examiner (which applicants do not concede), one would still not arrive at the aspects of the invention defined in claims 12 and 13. In the passage beginning at column 12, line 3, Moritani et al. specifically describes that the multi-layered packaging material is designed for packaging food which has been deaerated or the air replaced by an inert gas and then tight-sealed by heat-sealing or the like and further subjected to sterilization by boiling or retorting. This description, coupled with the absence of a description setting forth a need for an oxygen absorbent again leads to the conclusion that an improper resort to applicants' own specification has been made. Furthermore, Moritani et al. in no way remedies the deficiencies described above with regard to the defined oxygen gas barrier provided by the hydrophilic and water insoluble thermoplastic resin and also does not teach the specific sequence defined in the claims which has been shown to provide a significant effect on the characteristics of the material.

As an alternative to Koyama et al., the Examiner has relied on Bettle, III, U.S. Patent No. 5,320,889, with Daiichi Seiyaku and Teumac et al. This combination of documents is even further removed from the present invention since Bettle, III does not describe the presence of an oxygen scavenger and actually provides a reason as to why one would not be necessary. More specifically, the Examiner has alleged that it would be obvious to use an oxygen scavenger in the layer comprising HDPE/EVOH which is indicated by reference number 38 in Fig. 2. However, as plainly stated in the patent, the separate EVOH layer (reference number 42) is described as providing a complete oxygen

barrier which protects the contents of the bottle. This is evident from the description provided in the last paragraph of column 4 and in particular the last sentence thereof which states:

The wet side of the EVOH layer thus also functions as an oil barrier, and the dry portion of the EVOH layer, protected from both interior moisture and exterior moistures, functions as an oxygen barrier, thus providing a package which has superior flavor and taste retention properties.

Of course, even if there existed a proper basis for combining the respective documents, it still would not lead to any aspect of the invention as defined in the claims of record as there is again nothing which teaches the described sequence which has been shown to provide a material which is different from one wherein all components are blended together. Furthermore, even if an oxygen scavenger is arbitrarily incorporated into the layer comprising HDPE/EVOH, the EVOH would not provide an oxygen gas barrier as required by the claims. Thus, this combination of documents also falls far short from being sufficient to justify a rejection of any of the claims of record.

The rejection set forth in Section 4 starting on page 6 of the Official Action relies on the combination of Lofgren et al., U.S. Patent No. 5,133,999, in view of Daiichi Seiyaku and Teumac et al. Similar to that which was stated with respect to Bettle, III, Lofgren et al. does not describe the presence of an oxygen scavenger or the need for such a material. In this respect, the patent describes a layer indicated by reference number 14 in Fig. 1 that serves as an oxygen and flavor barrier. This barrier is discussed in the sentence bridging columns 2 and 3 which states:

According to the present invention, it has been [found] that a barrier layer consisting of a mixture of the non-polar component polyethylene and

the polar component ethylene vinyl alcohol co-polymer not only displays superior barrier properties vis-a-vis oxygen but also vis-a-vis flavour and odour ingredients of both polar and non-polar nature, and it has surprisingly been [found] that this barrier layer possesses better flavour barrier properties taken as a whole than a corresponding barrier layer consisting only of ethylene vinyl alcohol copolymer or a barrier of pure ethylene vinyl alcohol copolymer coated with polyethylene.¹

Accordingly, again absent improper reliance on applicants' own specification, those of ordinary skill in the art would find no reason for attempting to place an oxygen scavenger in a location where none is disclosed or stated as being required. Moreover, even if an oxygen scavenger is included in the disclosed layer, there is nothing teaching the claimed sequence and, as a result, the vast majority of the oxygen scavenger would not be provided with the defined oxygen gas barrier. Thus, this combination of documents is also far removed from the presently claimed invention and the claims of record are clearly patentable thereover.

The next combination of documents relies on Itamura et al., U.S. Patent No. 5,492,953, with Daiichi Seiyaku and Teumac et al. Itamura et al. relates to a resin composition comprising (A) a polyolefin, (B) a saponified product of an ethylene-vinyl acetate copolymer having defined characteristics, at least one of (C₁) at least one inorganic substance selected from titanium oxide, talc, calcium carbonate, mica and absorptive inorganic materials, (C₂) at least one compound selected from the group consisting of metal salts of certain higher fatty acids, metal salts, metal salts of ethylenediaminetetraacetic acid, and hydrotalcite, and (C₃) a polyolefin modified with an unsaturated carboxylic acid

¹ It is believed that the word "found" should be present at the indicated places.

or derivatives thereof, and (D) a saponified product of an ethylene-vinyl acetate copolymer having defined characteristics.

The absorptive materials are described in greater detail in the passage beginning at column 4, line 6. In this paragraph, the materials are specified as being "water-absorptive inorganic material" which include numerous salts and which are described as functioning to minimize deterioration of the gas barrier property of EVOH due to the absorption of moisture invading from the outside.

Even if the absorptive inorganic material is selected from the other alternatives, it is evident that it is for the purpose of absorbing water, not oxygen, the presence of which oxygen is protected against by the "high gas barrier property" of the component (D) as indicated in the sentence bridging columns 2 and 3. Thus, there is again no proper basis for making the proposed combination advanced in the Official Action. Furthermore, if the absorptive material is being relied on to justify the combination, it is without question that the patent requires an inorganic material and not ascorbic acid as described in Daiichi Seiyaku. Of course, this material is disclosed as being loaded into small bags which again is significantly different than the environment of the container. Still further, Itamura et al. does not teach that a hydrophilic reducing organic compound is to be added and, in Example 24, the Example referred to by the Examiner, only anhydrous sodium monohydrogen-phosphate is disclosed, which certainly does not meet the claimed hydrophilic reducing organic compound. Even if the claimed compound is added to the disclosed layer of the patent, it still would not be added in accordance with the present invention and would be akin to the comparative examples provided in the evidence of

record. Accordingly, the presently claimed invention is also patentable over the hypothetical combination of documents set forth in Section 5 of the Official Action.

Hofeldt et al., U.S. Patent No. 5,204,389, has been added to the foregoing combination of references and relied on for its teaching of an effective amount of ascorbate in order to reject claims 2 and 4 in one instance and claims 25 and 30 in another. While the additional reliance on this document further illustrates an improper reliance on applicants' specification to find bits and pieces of the invention and then to paste them together, the additional patent does not remedy the described deficiencies of the previously cited documents and clearly does not teach the claimed configuration and sequence which is defined in order to provide the recited oxygen gas barrier.

Hekal, U.S. Patent No. 6,130,263, has also been combined with Daiichi Seiyaku and Teumac et al.. Applicants do not concede that this patent constitutes "prior art" against the claims of the present invention given the two continuation-in-part applications relied on in the patent and in light of the priority dates claimed in the present application along with the verified English translations provided with the response mailed on February 28, 2000. However, even assuming that Hekal is available as "prior art", the patent would still not lead those of ordinary skill in the art to the presently claimed invention even when considered with Daiichi Seiyaku and Teumac et al.. Hekal relates to a polymer which contains a desiccant entrained therein. A desiccant is specifically designed to absorb moisture and can be one of three different types as set forth in column 7. In order to form "veins or channels that act as moisture communicating passages throughout the polymer", a channeling agent is present in the polymer matrix (see the sentence bridging columns 6 and

7). The channeling agent is described with greater specificity in the paragraph bridging columns 12 and 13 and is preferably a hydrophilic polar compound having at least several hydroxy groups. One technique of preparing the material is to combine the polymer-based matrix, the desiccating agent and the channeling agent together, preferably when all three components are in a powder state and before the polymer base is in a molten state (column 8, lines 12-15). Alternatively, the desiccating agent can be combined with a polymer that acts as a moisture barrier and then the channeling agent can be blended therein (column 10, lines 16 *et seq.*).

Based on the clear teachings of Hekal, those of ordinary skill in the art would not combine the teachings of Daiichi Seiyaku in the manner suggested by the Examiner. In essence, the Examiner has alleged that it would be obvious to try the ascorbic acid-containing zeolite of Daiichi Seiyaku in the polymer matrix of Hekal irrespective of the fact that Hekal does not indicate any requirement for an oxygen scavenger and Daiichi Seiyaku describes the presence of the ascorbic acid-containing zeolite in a porous bag in the interior of the container, and not in the container structure itself. Such a situation would clearly counsel away from the proposed combination of documents. Furthermore, even if there existed some valid reason for combining the documents, it still would not result in the presently claimed invention with the defined arrangement and sequence discussed above. In this regard, the specific requirement in Hekal of a channeling agent which "forms veins or channels that act as moisture communicating passages throughout the polymer" is the antithesis of forming an oxygen barrier layer as set forth in the claims. Therefore, even if there existed some proper basis for combining the documents, one would not arrive at the

presently claimed invention unless the Examiner is further taking the position that one can ignore this specific feature of the disclosed material. Thus, the claims of record are also patentable over this combination of documents.

The rejections set forth on pages 10-15 rely on documents all of which have been previously discussed and distinguished and further rely on Hofeldt et al. for its teaching of ascorbic acid as a reducing agent. Such a teaching does not remedy the previously discussed deficiencies of these other documents. Applicants first maintain that substantial reasons exist as to why the stated combinations are not proper, such as the preferred use of reducing iron in Koyama et al. and the absence of an oxygen scavenger or the disclosed need for the same in Bettle, III, Lofgren et al. and Itamura et al. Indeed, for this latter group, the explicit teachings of the documents relating to their respective gas barrier properties would lead those of ordinary skill in the art to understand that an oxygen scavenger is not required. To then rely on Hofeldt et al. to show that it would be "obvious" to use an oxygen scavenger where none is disclosed as being need, would again be an improper use of applicants' invention, would be the application of an improper "obvious to try" standard under 35 U.S.C. §103, and would be contrary to teachings in the documents themselves.

Furthermore, even to the extent that the prior art describes the presence of an oxygen scavenger and to the extent that the teachings of Hofeldt et al. could be combined, such combination would not lead to any aspect of the invention. In this respect, the claims specifically recite a sequence wherein the hydrophilic reducing organic compound (or both the hydrophilic reducing organic compound and the porous inorganic compound) are first

kneaded with the water insoluble thermoplastic resin wherein the hydrophilic reducing organic compound is included in the hydrophilic and water insoluble resin and the hydrophilic and water insoluble thermoplastic resin provides an oxygen gas barrier (which can be again contrasted with the oxygen permeability coefficient that is larger than the value set forth in Koyama et al.) and then the kneaded compound is dispersed in the hydrophobic thermoplastic resin. Hofeldt et al. at best only teaches the use of a moisture barrier and certainly does not teach the specific arrangement and sequence defined in the claims of record. Therefore, even if Hofeldt et al. can be properly combined with any of the other cited documents, it still would not lead to any aspect of the presently claimed invention.

The remaining document, namely Blinka et al., U.S. Patent No. 5,834,079, has been further relied on in combination with two sets of previously discussed documents to show that zeolites may be added to oxygen scavenger-containing compositions in order to absorb odor-causing reaction by-products. Applicants initially note that this patent was removed as "prior art" via the submission of the verified English translations of the priority documents, as explained in the Remarks of the response mailed on February 28, 2000, and repeated in the remarks of the response filed on November 4, 2002. If the Examiner is going to rely on this document, applicants request an explanation for this reliance.

Even if Blinka et al. is available as "prior art" and the stated reliance is proper, the additional combinations of documents would still not lead to the presently claimed invention with the defined arrangement and sequence and would clearly not lead to an

appreciation of the advantages which can be obtained therefrom that has been provided in the evidence of record.

Accordingly, none of the numerous hypothetical combinations of documents (to the extent that they are actually "prior art") would in anyway lead to the aspects of the present invention defined in the claims of record and applicants therefore respectfully request reconsideration and allowance of the present application.²

Should the Examiner wish to discuss any aspect of the application, he is invited to contact the undersigned attorney at the number provided below.

Respectfully submitted,

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² As to withdrawn claims 20 and 21, applicants again respectfully request rejoinder pursuant to the provisions of MPEP §821.04.